Agilent M9170A PXI Attenuator/Switch Driver Module

Data Sheet

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OVERVIEW

Introduction

Agilent now provides an attenuator/switch driver based on the modular PXI platform with an emphasis on ease of configuration and operation.

Product description

The Agilent M9170A one-slot PXI attenuator/switch driver module provides flexible drive control for the expansive portfolio of Agilent RF & microwave step attenuators and electromechanical switches. It is a PXI-hybrid compliant module, which comes with a full-featured graphical interface soft front panel (SFP) for ease of control and trigger.

To maximize the PXI chassis slot utilization and improve testing efficiency, the M9170A is able to drive a combination of:

- 12 external SPDT switches or
- 4 external SP4T/6T switches or
- 12 external transfer switches or
- 2 external step attenuators

Occupying just a single slot in a PXI chassis, the M9170A provides an alternative to drive Agilent's broad portfolio of standalone switches and attenuators.

The M9170A also provides over-current protection.

Applications

- Automatic Test Equipment (ATE)
- RF communications
- Engineering verification
- RF parametric measurements
- Mid- and high-density signal routing matrix

Features

- Drive up to 12 external SPDT switches, or 4 external SP4T/6T switches, or 12 transfer switches, or 2 external attenuators [1]
- Dual Voltage supply of 5V and 24V
- Dual variation of driving modes: pulsed and continuous
- Soft front panel provides a dynamic dashboard view and control of the connected attenuators or switches
- Point-to-point interface cable options available to facilitate seamless connection between the module and the various types of Agilent switches and attenuators

Customer values

- Maximize the PXI chassis slot utilization, which ultimately improves testing efficiency
- Ensure biasing compatibility with most switches and attenuators on the market therefore increasing system flexibility
- Allows quick selection of device models and the subsequent switch paths or attenuation levels
- Intuitive configuration for all Agilent switches and attenuators

1. *The amount of switches and/or attenuators that can be simultaneously driven is restricted by the load current of 2A per bank.*

EASY SETUP ... TEST ... AND MAINTENANCE

Hardware platform

Connectors

The M9170A consists of two independent banks with 12 channels in each bank. Connection to each bank is made via the front panel through a 20-pin connector header. Please refer to the *M9170A Configuration Guide* (5991-0052EN) for instructions on point-to-point connection between the driver module and the switches/attenuators.

Interface cables

The M9170A occupies one slot in a PXI chassis and is connected to the external switches and attenuators by selecting one of the six customized interface cables. These cables will facilitate a convenient and secure connection for all devices. By having the interface cable, without mounting the switches or attenuators onto the module, you can freely attach an RF switch to the system to create the shortest length between the switch and the instrument. A shorter RF path ensures minimum power loss.

Compliance

The M9170A is PXI compliant using either a PXI-H, PXI-1 or cPCI slot. Designed to benefit from fast data interfaces, the M9170A can be integrated with other test and automation modules in PXI, Compact PCI, and Hybrid chassis. The PXI format offers high performance in a small rugged footprint and is an ideal deployment platform for many automated test systems. A wide array of complementary PXI products is currently available. Products include multimeters, waveform generators, local oscillators, digitizers, and switch multiplexers.

Software platform

Drivers

Agilent's M9170A comes complete with software drivers for Windows XP, Windows Vista, Windows 7, and LabVIEW. Also included are application code examples for LabVIEW, LabWindows/CVI, Visual Studio, C, C++, and MATLAB.

Customized interface cables

M9170A-001

M9170A-002

M9170A-003

M9170A-201

M9170A-501

M9170A-601

EASY SETUP ... TEST ... AND MAINTENANCE

Soft Front Panel (SFP)

The M9170A graphical user interface guides developers through the module setup process. Users can quickly configure the module parameters. The interfaces are implemented using the IVI standard supporting both IVI-COM and IVI-C. The soft front panel provides an intuitive approach for program simulation and troubleshooting.

Figure 1 below shows the SFP of the M9170A, which allows the user to select the supply voltage, drive mode, and the switch/ attenuator model (for each bank).

As shown in Figure 2a and 2b, the SFP provides a list of compatible switches and attenuators that could be driven by the M9170A. The flexibility of this PXI attenuator/switch driver module provides intuitive configuration for all Agilent switches and attenuators.

The soft front panel provides an overall dynamic dashboard view of the switch and/or attenuator status of the switching states and attenuation levels. In addition to the dynamic dashboard view, you can also run IVI command to get the required state and attenuation levels, whether the drive line is in OPEN state or GND state.

Detailed configuration information is available in *Agilent M9170A Configuration Guide, 5991-0052EN*.

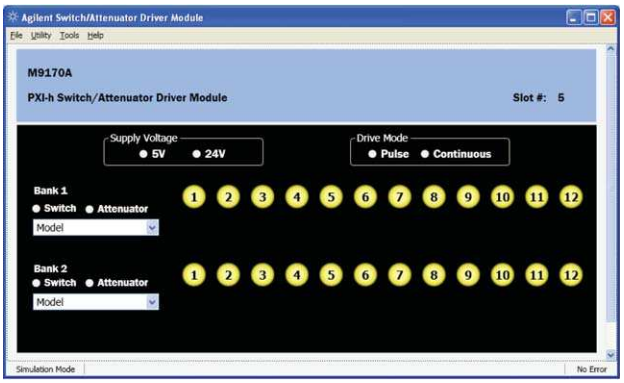


Figure 1. Soft front panel for M9170A

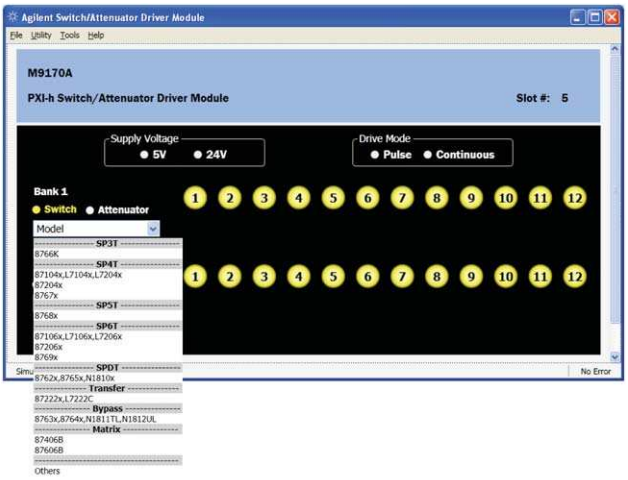


Figure 2a. Selection of switch models via M9170A soft front panel

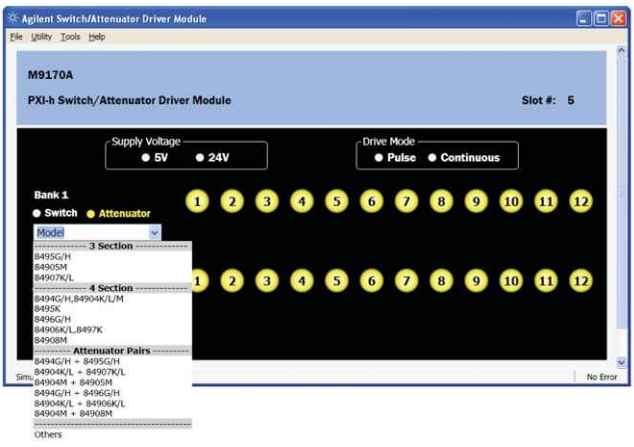


Figure 2b. Selection of attenuator models via M9170A soft front panel

Easy software integration

Agilent's M9170A comes complete with software drivers for Windows XP, Windows Vista, Windows 7, and LabVIEW. Also included are application code examples for LabView, LabWindows/CVI, Visual Studio, C, C++, C#, Visual Basic, and MATLAB, which provide the M9170A setup and basic switching functionality. The application code examples are easily modified to quickly integrate the module into your measurement system.

Calibration intervals

The M9170A is factory calibrated and shipped with an ISO-9001, Functional Test Certificate (FTC).

Figure 3. Drive three SPDTs with M9170A using Option 601 interface cable

TECHNICAL SPECIFICATIONS

Specifications

Drive Power Supply	M9170A
Voltage	23 ± 10% 4.5 ± 10%
Current	1.0A for 24V supply 3.85A for 5V supply

Power requirements

Power consumption from the backplane supply is as follows:

Voltage	+3.3 V	+5 V	–12 V	+12 V
Current	0.5 A	30 mA (min) 5.6 A (max)	0	30 mA (min) 0.8 A (max)

Dynamic characteristics

Typical operating speed = 17 ms

Input characteristics

Channels = 24 single-coil non-latching relay drivers

Environmental and physical specifications

Temperature range	
Operating	0 to 55 °C
Non-operating	–40 to 70 °C
Relative humidity	
Operating	95% RF at 40 °C, 24 hours cycling, repeated 5 times
Non-operating	50% RH at –10 to 25 °C, 24 hour cycle
Vibration	
Operating random	5—500 Hz, 0.3 g RMS
Vibration	
Survival random vibration	5—500 Hz, 3.41 g RMS
Shock	
End use handling shock	Half sine wave form, 120 in/s, duration < 3 ms
Transportation shock	Trapezoidal, 50 g
Altitude test	
Operating/non-operation	15,000 ft (4600 m)
ESD immunity	
Air discharge	15 kV per IEC61000-4-2
Direct discharge	8 kV per IEC61000-4-2
Safety	This product has input power below the requirements as specified in the Low Voltage Directive (2006/95/EC)
EMC	EMC Standard: IEC 61326-1:2005 / EN 61326-1:2006 Emissions: CISPR 11:2003 / EN55011:2007 Immunity: IEC 61000-4-3:2002 / EN 61000-4-3:2002 Electrostatic Discharge: IEC 61000-4-2:2001 / EN 61000-4-2-:1995+A1:1998+A2:2001 EMC/EMI:CE, C-Tick
CE compliance	EMC Compatibility Directive (EMC): 2004/108/EC
Warm-up time	Refer to PXI Chassis warm up time

Dimensions

M9170A	3U PXI/Compact PCI standard Front panel complies with IEEE 1101.10 certification and compliance. 174.8 x 128.7 x 20 mm
Weight	230 g
Connector compatibility	PXI-H, PXI-1, cPCI

CONFIGURATION

Software

Model	Description
Software development platform	Microsoft Visual Studio with C/C++ Microsoft Visual Studio .NET with C# or Visual Basic, National Instruments LabVIEW, National Instruments, LabWindows CVI, The MathWorks MATLAB, Agilent VEE
Supported operating systems	Windows XP SP3, 32-bit Windows Vista 32/64-bit Windows 7 32/64-bit
Drivers provided	IVI-COM, IVI-C, LabView, MATLAB
Included GUI	Soft front panel
Application code examples	C, C++, C#, Visual Basic, VEE, MATLAB

Recommended configuration

Model	Description
M9018A	PXIe chassis, 18-slots, 3U, 8 GB/s
M9170A	PXI-h attenuator/switch driver module
M9170A-501	Interface cable, 20 pin to 9 pin DSUB (x6) for N1810x SPDT switch
N1810TL	Coaxial switch, DC up to 67 GHz, SPDT

Module and chassis compatibility

PXI chassis compatibility
Compatible with all chassis conforming to the 3U PXI and 3U cPCI specifications
Compatible with Agilent M9018A PXIe chassis, 18-slots, 3U, 8 Gb/s

Ordering information

Model	Description
M9170A	PXI-h attenuator/switch driver module
Options	
001	Interface cable, 20 pin to 10 pin DIP (x6) for transfer switch
002	Interface cable, 20 pin to 10 pin DIP for step attenuator
003	Interface cable, 20 pin to 12 pin Viking connector for step attenuator
201	Interface cable, 20 pin to 16 pin bare wire for solder lug switch
501	Interface cable, 20 pin to 9 pin DSUB (x6) for N1810x SPDT switch
601	Interface cable, 20 pin to 16 pin DIP (x2) for 8710x/L710x switch

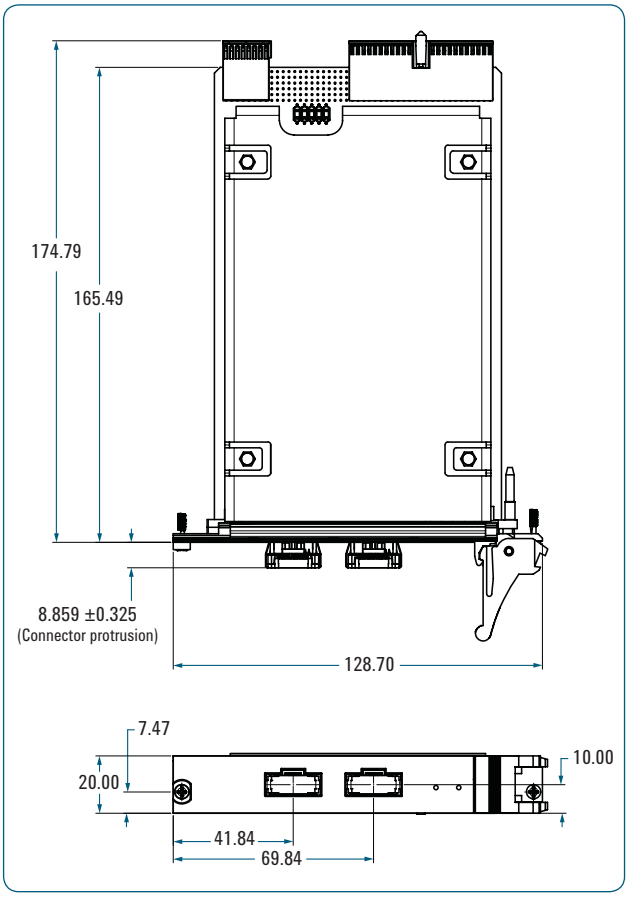
Related products

Model	Description
M9018A	PXIe chassis, 18-slots, 3U, 8 GB/s
87106C	Multiport coaxial switch, DC to 26.5 GHz, SP6T
8765C	Coaxial switch, DC to 26.5 GHz, SPDT
8496G	Programmable attenuator, DC to 4 GHz, 110 dB, 10 dB steps
L7104A	Multiport coaxial switch, DC to 4 GHz, SP4T, Terminated
8494H	Programmable attenuator, DC to 18 GHz, 11 dB, 1 dB step
M9155C	PXI dual SPDT coaxial switch, DC to 26.5 GHz, Unterminated
M9157C	PXI single SP6T coaxial switch, DC to 26.5 to GHz, Terminated

Figure 4. M9170A can drive multiple switches and attenuators with the point-to-point interconnect

MECHANICAL INFORMATION

Dimensions are in mm nominal, unless otherwise specified.



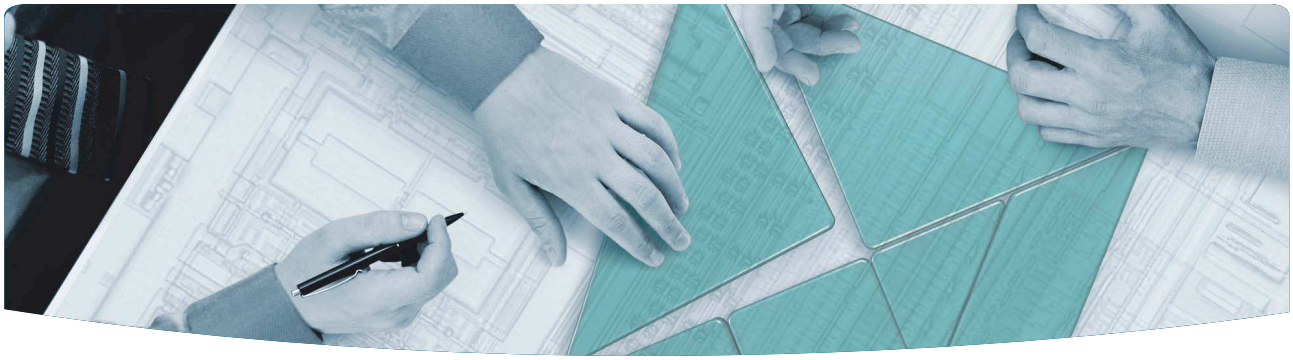
WARRANTY AND CALIBRATION

Advantage Services: Calibration and Warranty

Agilent Advantage Services is committed to your success throughout your equipment's lifetime.

Warranty

R-51B-001-C	1 year Return-to-Agilent warranty
R-51B-001-3C	1 year Return-to-Agilent warranty extended to 3 years
R-51B-001-5C	1 year Return-to-Agilent warranty extended to 5 years



The Modular Tangram

The four-sided geometric symbol that appears in this document is called a tangram. The goal of this seven-piece puzzle is to create identifiable shapes—from simple to complex. As with a tangram, the possibilities may seem infinite as you begin to create a new test system. With a set of clearly defined elements—hardware, software—Agilent can help you create the system you need, from simple to complex.

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Product specifications and descriptions in this document subject to change without notice.

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